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REPORT ON THE CRAYFISHES OF ALABAMA: LITERATURE AND MUSEUM DATABASE REVIEW, SPECIES LIST WITH ABBREVIATED ANNOTATIONS AND PROPOSED CONSERVATION STATUSES

ILLINOIS NATURAL HISTORY SURVEY, CENTER FOR BIODIVERSITY
TECHNICAL REPORT 2004 (12)

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INTRODUCTION

The aquatic biodiversity of Alabama is legendary. It is common knowledge that Alabama has more species of fishes, freshwater clams and gastropods as well as lesser known groups such as caddisflies than any other state in the union (Boschung and Mayden 2004). It is not surprising; therefore, that Alabama would also have a diverse crayfish fauna. In 1976 Raymond Bouchard provided a list of 58 Alabama crayfish species and estimated that the number would approach 75 species when the fauna had been thoroughly surveyed. Almost 30 years later not only has Bouchard's prediction come true, but that number is well exceeded. Bouchard's accurate prognostication was due to his intimate knowledge of crayfish taxonomy and biogeography. As was pointed out by Boschung and Mayden (2004), Alabama has a relatively mild, stable climate, but perhaps more importantly, glaciation did not reach as far south as Alabama, and therefore the physiography, geology and topology of the state have been relatively unchanged for millions of years.

In terms of crayfish evolution, one of the most important physiographic provinces in Alabama is the Cumberland Plateau (Ortmann 1931). It has been speculated (Ortmann 1905, 1931; Hobbs 1969) that it is the center of radiation for the crayfish genera *Cambarus* and *Orconectes*, both of which are important components (>50% of the species) of the Alabama fauna. The Cumberland Plateau is the second largest physiographic province in the state (Boschung and Mayden 2004), and influences most of the northern section of the state.

Certainly another important aspect of the evolution of aquatic organisms in Alabama is the diversity of river systems in the state. Three major basins drain Alabama: the Ohio River, Mobile River and the Apalachicola River. In addition, there are four relatively isolated Coastal Plain drainages: Pascagoula River, Perdido Bay, Pensacola Bay, and Choctawhatchee Bay (Boschung and Mayden 2004). The long term isolation (until the recent connection of the Tombigbee and Tennessee river systems) of the major basins and the coastal drainages, and hence the isolation of populations, undoubtedly provided for important evolutionary mechanisms to occur.

This study was undertaken with three main objectives in mind. The first objective was to develop a complete bibliography of the primary and gray literature on Alabama crayfishes. The second was to develop a complete up-to-date list of crayfish species known to occur in Alabama. The last objective was to provide abbreviated species accounts and to recommend a conservation status for each species.

METHODS

In order to prepare a comprehensive bibliography for the crayfishes of Alabama an intensive literature review was undertaken. All primary literature publications (journal articles, books and monographs, etc.) with reference to Alabama crayfishes were included. An effort was also made to review of the gray literature (i.e., state and federal agency reports, masters' theses, doctoral dissertations, etc.). This literature is sometimes difficult to obtain, and often requires detective work to even know of its existence. As such, the search of the gray literature is always an on-going process.

The development of the Alabama crayfish species checklist involved the compilation of all literature records and available electronic databases. The electronic databases that were available to us included: National Museum of Natural History, Smithsonian Institution, University of Alabama Museum of Natural History, Auburn University Natural History Museum and the Illinois Natural History Survey. The records from each of the databases were compared with published records for each species. Therefore, the final checklist presented in this report represents those that have been verified through literature records, and by vouchered specimens at the above listed institutions.

It should be realized that not all important museum holdings are represented. For example, the collections in the Tulane Museum of Zoology have not yet been accessed. The data from those collections have not yet been entered into an electronic database, and therefore would require actual visits to the museum to determine the Alabama holdings. The Tulane Museum is an important repository for Alabama crayfishes because of the work of Dr. Royal D. Suttkus and Dr. Joseph Fitzpatrick, Jr. Dr. Suttkus is an ichthyologist who for many years collected fishes and crayfishes in Alabama. All of these collections are in the Tulane Museum. Dr. Fitzpatrick was for many years at South Alabama University and during that time collected all over the southeast, but especially in Alabama. His collections were deposited both at Tulane and at the National Museum. It is therefore imperative that any future studies of the crayfishes of Alabama include extensive visits to the Tulane Museum of Zoology. In addition to Tulane, other museums still need to be surveyed for Alabama records. These include the Museum of Comparative Zoology at Harvard, the Carnegie Museum in Pittsburgh, and the Academy of Natural Sciences in Philadelphia.

The individual species accounts included known national and Alabama distributions, known habitat preferences and provisional conservation status. These data were the main focus of this study. The accounts do not include morphological and color descriptions of the species nor do they include notes on their biology. These require extensive field and museum work and will be added as our study of Alabama crayfishes progresses. The abbreviated species accounts were written primarily based on published literature (both primary and gray literature). All original published species descriptions were read, as were any publications that provided information on individual species or groups of species within a given geographic range (i.e., river system). The main source of distributional literature was Hobbs (1989).

The primary source for the national conservation status of individual species was Taylor, et al. (1996). In the species accounts this is referred to as "AFS." In order to determine provisional Alabama conservation status for each species Taylor, et al. (1996) as well as Bouchard (1976) and Fitzpatrick (1990) were consulted. In addition, the records for each species in the electronic databases were also used. The final provisional conservation for each species was determined through a consensus of the authors. In the species accounts this is referred to as "Provisional Al." It should be noted that for a high number of species, the assignment of accurate conservation priorities is severely hampered by limited distributional and demographic data.

The provisional Alabama conservation statuses were determined by using the stipulations and guidelines that were developed during a July, 2002 Wildlife Symposium held by the Alabama Wildlife and Freshwater Fisheries Division. These priority designations were defined as:

Extinct - taxa that historically occurred in Alabama, but are no longer alive anywhere within their former distribution.

Extirpated - taxa that historically occurred in Alabama, but are now absent; may be rediscovered in the state, or be reintroduced from populations existing outside the state.

Extirpated/Conservation Action Underway - taxa that historically occurred in Alabama, were absent for a period of time, and currently are being reintroduced, or have a plan for being reintroduced, into the state from populations outside the state.

Priority 1/Highest Conservation Concern - taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability due to natural/human-caused factors. Immediate research and/or conservation action required.

Priority 2/High Conservation Concern - taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; specialized habitat needs/habitat vulnerability due to natural/human-caused factors. Timely research and/or conservation action needed.

Priority 3/Moderate Conservation Concern - taxa with conservation problems because of insufficient data **or** because of two of four of the following: small populations; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; specialized habitat needs/habitat vulnerability due to natural/human-caused factors. Research and/or conservation action recommended.

Priority 4/Low Conservation Concern - taxa that are secure, yet conservation concerns exist because of one of four of the following: relative abundance; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; specialized habitat needs/increasing habitat vulnerability due to natural/human-caused factors. Research on specific problem suggested.

Priority 5/Lowest Conservation Concern - taxa that are demonstrably secure, with size of population stable/increasing, geographical distribution stable/expanding, population trend/ population viability stable/increasing, relatively limited habitat vulnerability due to natural/ human caused factors, **or** an unusual visitor to the state. No specific monitoring or conservation action needed.

RESULTS

History of Astacology in Alabama

Until 1870, the crayfishes of Alabama went almost unnoticed. Hagen (1870) commented that "nearly the whole state remains unexplored." He provided the first checklist of crayfishes from Alabama. It included 5 species: *Cambarus advena* (=*Procambarus hagenianus hagenianus*), *C. immunis* (=*Orconectes immunis*), *C. acutus* (=*P. acutus*), *C. lecontei* (=*P. lecontei*), and *C. versutus* (=*P. versutus*). Two of these species, *P. lecontei* and *P. versutus*, were the first Alabama crayfish species actually described from Alabama specimens. The specimens of both species were collected by Louis Agassiz on a trip to Mobile in the early 1850s.

A century after Hagen's work, Bouchard (1976) provided a second attempt at a checklist of Alabama crayfishes. He listed 58 species for the state and estimated that approximately 75 will be known when the fauna has been completely surveyed. In addition, he was the first to attempt to determine the conservation status for the crayfishes of Alabama. He listed 14 species in need of protection. One was listed as threatened, while the remaining 13 were listed as species of special concern. From 1976 to present an additional 16 taxa (15 species and one subspecies) with Alabama distributions have been described.

Hobbs (1989), an illustrated checklist of American crayfishes, provided a list of 72 species from Alabama, with 2 species being listed as questionable. One of these two, *Fallicambarus hedgpethi*, has been put into synonymy with *Fallicambarus fodiens*, while the other, *Procambarus bivittatus*, is now considered to be a member of the state's fauna.

Fitzpatrick (1990a), although not providing a checklist for the state, did recommend a conservation status for 41 species. Of these 41 species, 11 were considered to be rare, three were listed as threatened, while the remainder were given the status of special concern. Taylor, et al. (1996) was the first attempt to provide the conservation status of all known species of crayfishes from the United States and Canada. They listed 80 species as occurring in Alabama, and provided the conservation status for each of these species. Since 1996, *Cambarus veitchorum* and *Orconectes sheltae* are the only new species with Alabama distribution to have been described.

In addition to the above attempts to provide a complete listing the crayfish fauna of Alabama, numerous species have been described based on Alabama specimens. Table 1 provides a list with citations of the 32 species and one subspecies that have been described from Alabama specimens. Figure 1 provides the temporal distribution of new crayfish species descriptions with Alabama distributions from pre-1900 to present. The graph indicates two peak periods of new species publications. The first peak is pre-1900 period, during which time 29 species with Alabama distributions were described. The second peak period for new descriptions was from 1950 to the present.

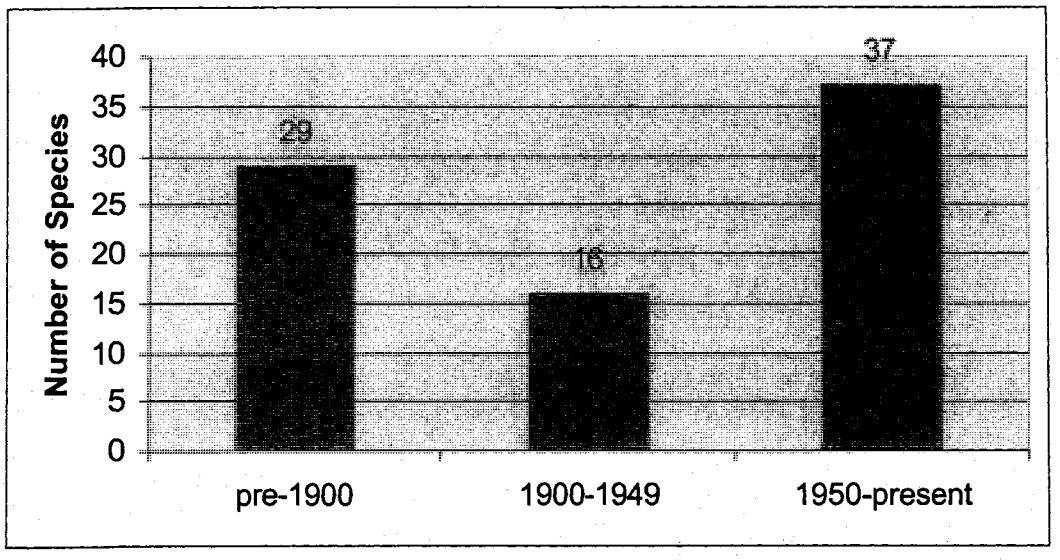

Figure 1. Number of Alabama crayfish species described pre-1900 to present.

Taxonomic Literature

During the first two periods shown on the Figure 1, the most productive individual with regard to Alabama species descriptions was Walter Faxon (Faxon 1884, 1885, 1890, 1898, and1914). He described 16 of the presently known Alabama species. The period from 1950 to the present coincides with the prodigious work of Horton Hobbs, Jr. (Hobbs 1938, 1941, 1942, 1945, 1952, 1953, 1966, 1967,1968a, 1968b,1969, 1971, 1972a, 1972b, 1973, 1975, 1981, 1984 1989; Bouchard and Hobbs 1976; Cooper and Hobbs 1980); Hobbs and Barr 1960; Hobbs and Hall 1969 and 1972; Hobbs and Hart 1959; Hobbs, Jr. and Hobbs, III 1990; Hobbs et al. 1977; Hobbs and Walton 1957,1959 and 1960). He described or co-authored descriptions of 32 of the species that are known to reside in Alabama, almost 40% of the fauna. Faxon and Hobbs together described almost 60% of the known Alabama crayfish fauna.

Other authors who have contributed greatly to the current knowledge of Alabama crayfishes include the following individuals. Raymond Bouchard provided new species descriptions, descriptions of new subgenera, provisional conservation status as well as distributional and biogeographic data on Alabama crayfishes (Bouchard, 1972, 1974a, 1974b, 1974c, 1976, 1978; Bouchard and Hobbs 1976; Bouchard and Bouchard 1995). The work of John and Martha Cooper provided descriptions of new species, as well as new knowledge about the biology of cave crayfishes in Alabama (Cooper 1975; Cooper and Cooper 1976, 1977, 1997a, 1997b; Cooper and Hobbs 1980). Joseph F. Fitzpatrick, Jr. also provided new species descriptions, revisions of genera with descriptions of new subgenera, provisional conservation status, and distributional and biogeographic data on Alabama crayfishes (Fitzpatrick 1977, 1978a, 1978b, 1983, 1987a, 1987b, 1990a, 1990b, 1991, 1992, 1996; Fitzpatrick and Laning 1976; Fitzpatrick and Payne 1968). Fitzpatrick was arguably the most active North American crayfish expert in the past 30 years, with the exception of Horton Hobbs, Jr.

Many other species with Alabama distributions were described by a variety of workers over the past 200 years (Black 1968; Bundy 1877; Cope 1872, 1881; Cottle 1863; Creaser 1933; Erichson 1846; Fabricius 1798; Hall 1959; Hay 1899, 1902; LeConte 1856; Penn and Marlow 1959; Rhoades 1941, 1944; and Walls 1972). Since 1990 only four new species and one new subspecies with Alabama distributions have been described (Cooper and Cooper 1997a, 1997b; Fitzpatrick 1990, 1992; and Hobbs and Hobbs 1990). This could very well mean that we are approaching an end to the descriptions of new species with Alabama ranges. However, examination of the available museum crayfish databases does not necessarily indicate this to be true (see Possible New Species section below).

Non-Taxonomic Literature

In addition to new species descriptions and revisions of genera and subgenera, a number of biological, ecological and/or inventory type studies have been done on Alabama crayfishes. Ortmann (1931) provided early distribution records for crayfishes occurring in the southern Appalachians and Cumberland Plateau of northern Alabama. What is currently known about Alabama cave crayfishes is the result of work done by Cope (1881), Hay (1902), Rhoades (1941), J.E. and M.R. Cooper (e.g., Cooper 1975; Cooper and Cooper 1976, 1977, 1997a, and 1997b), Hobbs, Jr. and Barr (1972), Hobbs, Jr., et al. (1977), Hobbs, III (1992), Hobbs, III and Bagley (1989), McGregor et al. (1997) and Rheams et al. (1992 and1994) all of whom studied the caves in northern Alabama. In their inventory work Buchanan (1992) [Cahaba River], Harris, et al. (1987) [Warrior Coal Basin], McGregor et al. (1999) [Alabama and lower Tombigbee rivers], Ratcliffe and DeVries 2004 [Tallapoosa River], and Yarbrough (1973) [Tallapoosa and Chattahoochee rivers] all provided additional biological and distributional information on crayfishes in their study areas. Buchanan (1992) has done the only study that has focused on burrowing species of crayfishes in Alabama.

In terms of the conservation of Alabama crayfishes, the works of Bouchard (1976), Fitzpatrick (1990), and Taylor et al. (1996) have already been discussed above. Fitzpatrick (1991) provided a report on the current status of *Cambarus miltus* in the state, while Hartfield (1991) indicated, based on current knowledge, that no action regarding the federal listing of *C. miltus* was necessary. Hartfield (1992) indicated, based on current information, that no action on the possible federal listing of *Procambarus lagniappe* was necessary. Butler (2002a and 2002b) provided comprehensive reviews of the conservation of crayfish species in the southern Appalachian and the lower Tennessee Cumberland ecosystems. These reviews included discussions about the fauna, the zoogeography and the conservation status of numerous Alabama crayfish species, as well as identifying high priority stream systems.

Alabama Crayfish Fauna

Table 2 provides a taxonomic checklist of the crayfish species currently known from Alabama. The list is presented in alphabetical order by subfamily, genus and species. Also provided are the authors of the species and the date of the original description. The citations can be found in the bibliography at the end of this report.

The list contains 80 nominal species and one species [*Cambarus* (*Tubericambarus*) sp. A] that is currently being described. All crayfishes living in Alabama belong to the family Cambaridae. Within Cambaridae there are two subfamilies, Cambarellinae and Cambarinae. Representatives of both subfamilies reside in Alabama.

The subfamily Cambarellinae has a single genus, *Cambarellus* of which three species are known from Alabama. The remaining 78 species belong to the subfamily Cambarinae. In Alabama the Cambarinae are comprised of six genera: *Cambarus, Fallicambarus, Faxonella, Hobbseus, Orconectes,* and *Procambarus*. The genus *Cambarus*, one of the largest crayfish genera in Alabama consists of 10 subgenera and 25 species. All species of the genus *Fallicambarus* in Alabama belong to the subgenus *Creaserinus* of which there are five. The genus *Faxonella* is represented by a single species as is the genus *Hobbseus*. The genus *Orconectes*, also one of the largest crayfish genera in Alabama, consists of seven subgenera and 20 species. The genus *Procambarus*, is the largest genus in Alabama with six subgenera and 28 species.

Table 3 provides a listing of nine species that have in some way been reported from the state, however, we feel, that for the reasons given, it is questionable if they actually reside in the state. All of these dubius records were found while searching the available databases. In order to determine with certainty the status of these species in Alabama, the actual specimens need to be examined in the respective museums.

Table 4 provides a listing of all known crayfish species that reside in Alabama, and their current distribution in the state by river system. The Tennessee River system has the greatest diversity of crayfishes with 37 species (45% of the known Alabama fauna) of which 15 are known only from this system, followed by the Tombigbee and Alabama rivers each with 30 known species. The river systems with the lowest crayfish diversity are the Perdido River system with three known species, followed by the Choctawhatchee River system with nine known species. *Procambarus versutus* has been recorded from 12 of the 13 drainages in the state, which indicates it is the most widespread species in the state. It is followed by *Procambarus spiculifer* which is know from 11 drainages, while three species (*Cambarus latimanus, C. diogenes* and *C. acanthura*) are known from 10 drainages. Thirty-four species (41% of the known Alabama fauna) are known only from a single drainage system.

Two species, *Cambarus* sp. A and *Procambarus zonangulus*, have a question mark in the drainage totals of Table 4 because the distribution of each of these species is very uncertain. *Cambarus* sp. A is an undescribed species that is easily confused with other closely related species so that museum records need to be examined in order to determine the distribution of this species in Alabama. *Procambarus zonangulus* is

closely related to *P. acutus* and it is probable that the identification of these two species has been confused. Examination of museum specimens is required to determine the exact distribution of each of these species in the state.

Figure 2 shows the number of crayfish species by major drainage unit. The Mobile Bay Basin has the largest number of species with 54 or 65% of the known Alabama species. This is followed by the Tennessee River system (Ohio River Basin) with 37 or 45% of the known species. The Chattahoochee River system (Apalachicola River Basin) has the lowest diversity with 13 or 16% of the known species.

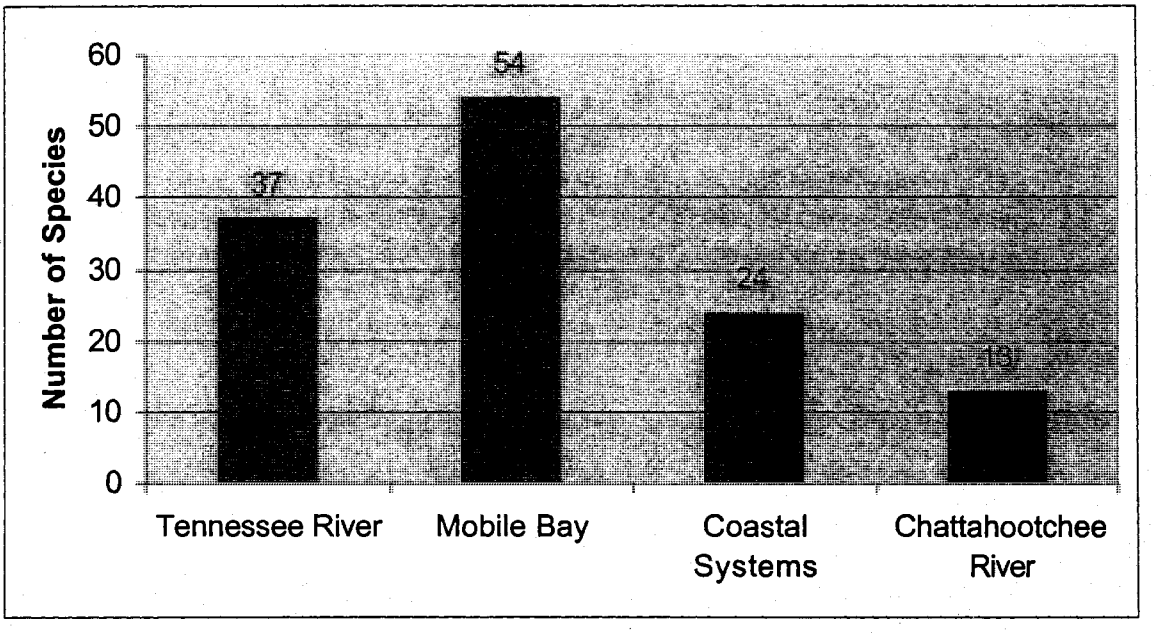

Figure 2. Number of crayfish species by major drainage unit.

Possible New Species

As has already been pointed out, there is one new species, *Cambarus* sp. A, that is currently being described by others. It is a widespread species that ranges into Alabama (Jezerinac 1993). In addition to this species, it is likely that there may be other undescribed species in the state. For example, in the database records of the NMNH there are one *Cambarellus*, three *Cambarus*, and nine *Orconectes* manuscript species names listed. This indicates that H. H. Hobbs, Jr. or others thought that these specimens probably represented undescribed species. In addition, in the Auburn University Museum database at least two *Cambarus* taxa are presented as being undescribed, and in the University of Alabama Museum collections at least five taxa (three *Orconectes* and two *Procambarus*) are given as being new to science. The crayfish workers who thought these forms were undescribed species, for the most part, were Drs. Hobbs and Fitzpatrick, both of whom were very familiar with the Alabama fauna. It is possible that some of these have already been described under other names, and the museum records have not been up-dated to reflect that. It is possible that some of these may represent variations of already described species. It is also possible that, in fact, some of these are new species.

In all cases listed above, intensive museum work followed by fieldwork needs to be done to determine the validity of these so called new species. What is clear from these database records is that there is a great need for additional taxonomic evaluation of museum collections.

SPECIES ACCOUNTS

Subfamily Cambarellinae

***Cambarellus diminutus* Hobbs 1945; Least Crayfish**

Distribution. North America: Mobile County, Alabama; George and Jackson counties, Mississippi (Hobbs 1989). Alabama: Known from eight database records, all from Mobile and Washington counties in the Mobile Basin.

Habitat. Ditches, pools in sluggish streams (Hobbs, 1989)

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Cambarellus lesliei* Fitzpatrick and Laning 1976**

Distribution. North America: Baldwin, Mobile and Washington counties Alabama; George County Mississippi (Hobbs 1989). Alabama: Known from 17 database records, from Baldwin, Mobile and Washington counties in the Mobile Bay, Tombigbee and Alabama river systems.

Habitat. Streams and pools (Hobbs 1989).

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Cambarellus shufeldtii* (Faxon 1884); Cajun Dwarf Crayfish**

Distribution. North America: Alabama, Arkansas, southern Illinois, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee (Hobbs 1989). Alabama: Known from nine database records, all from Mobile County in the Mobile Basin.

Habitat. Ditches, marshes, swamps, lakes, ponds, and sluggish streams (Hobbs 1989).

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Subfamily Cambarinae

Cambarus acanthura **Hobbs 1981**

Distribution. North America: Alabama, Georgia and Tennessee (Hobbs 1989). Alabama: Tennessee, Tombigbee, Blackwater, Alabama, Cahaba, Coosa, Pascagoula, Perdido, Escambia, and Chattahootchee river systems.

Habitat. Primary and secondary burrower (Hobbs 1989)

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Cambarus bartonii cavatus **(Fabricius 1798); Appalachian Brook Crayfish**

Distribution. North America: New Brunswick, Canada west to Kentucky and Tennessee, south to Alabama, Georgia and South Carolina and east to the Atlantic Ocean (Hobbs 1989). Alabama: Known only from two database records from the Chattahootchee River system.

Habitat. First and second order streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Cambarus coosae **Hobbs 1981**

Distribution. North America: Restricted to the Coosa River system in Georgia and Tennessee and south into Alabama (Hobbs 1989). Alabama: Mobile, Alabama, Cahaba, and Coosa river systems.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Cambarus cracens **Bouchard and Hobbs 1976**

Distribution. North America: Known only from Alabama (Hobbs 1989). Alabama: Described from the Tennessee River system; questionable database records from the Blackwater, Coosa and Tallapoosa river systems.

Habitat. Streams under rocks.

Conservation Status. AFS Endangered; Provisional AL Priority 3.

Cambarus diogenes **Girard 1852; Devil Crawfish**

Distribution. North America: Extremely widespread; from the Rockies to southern Canada to New Jersey and throughout the Mississippi River basin (Hobbs 1989). Alabama: Known from all river systems in Alabama, except the Cahaba, Pascagoula and Perdido river systems.

Habitat. Secondary and primary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Cambarus distans **Rhoades 1944; Boxclaw Crayfish**

Distribution. North America: Cumberland and Tennessee river systems in Alabama, Georgia, Kentucky and Tennessee (Hobbs 1989). Alabama: Known only from three database records from the Tennessee River system.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Cambarus englishi **Hobbs and Hall 1972**

Distribution. North America: Endemic to the Tallapoosa River system in Alabama and Georgia (Hobbs 1989). Alabama: Restricted to the Tallapoosa River system, and known from 16 database records.

Habitat. Streams under rocks.

Conservation Status. AFS Special Concern; Provisional AL Priority 4.

Cambarus girardianus **Faxon 1884**

Distribution. North America: Tennessee River system in Alabama, Georgia, Mississippi, and Tennessee; specimens from the Coosa River system in Alabama may be referable to this species (Hobbs 1989). Alabama: Known from the Tennessee River system; database records also from the Mobile, Cahaba and Coosa river systems, however, these records may represent an undescribed taxon.

Habitat. Streams under rocks.

Conservation Status. ASF Currently Stable; Provisional AL Priority 3.

Cambarus graysoni **Faxon 1914; Twospot Crayfish**

Distribution. North America: Nashville Basin, Highland Rim and western edge of the Cumberland Plateau in Alabama, Kentucky and Tennessee. Alabama: Known only from six database records from the Tennessee River system.

Habitat. Streams under rocks; secondary burrower.

Conservation Status. ASF Currently Stable; Provisional AL Priority 4.

Cambarus halli **Hobbs 1968**

Distribution. North America: Thought to have been endemic to the Tallapoosa River system in Alabama and Georgia (Hobbs 1989). Alabama: Known from the Tallapoosa River system; questionable database records exist from the Tennessee, Alabama, Cahaba and Coosa river systems.

Habitat. Streams under rocks.

Conservation Status. ASF Special Concern; Provisional AL Priority 3.

Cambarus hamulatus **(Cope 1881)**

Distribution. North America: Tennessee River system, Alabama. Alabama: Known from 20 database records from Blount, Jackson and Marshall counties. Thought to have been restricted to caves in the Tennessee River system in Alabama; one questionable database record from the Blackwater River system.

Habitat. Subterranean streams.

Conservation Status. ASF Currently Stable; Provisional AL Priority 3.

Cambarus howardi **Hobbs and Hall 1969**

Distribution. North America: Chattahootchee River system in Alabama and Georgia. Alabama: Known only from nine database records from the Chattahootchee River system.

Habitat. Streams under rocks.

Conservation Status. AFS Special Concern; Provisional AL Priority 3.

Cambarus jonesi **Hobbs and Barr 1960; Alabama Cave Crayfish**

Distribution. North America: Caves in the Tennessee River system in Alabama (Hobbs 1989). Alabama: Known only from eight database records from caves in the Tennessee River system between Florence and Guntersville (Hobbs 1989).

Habitat. Subterranean streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Cambarus latimanus **LeConte 1856**

Distribution. North America: Alabama, Florida, Georgia and North Carolina (Hobbs 1989). Alabama: Reported from all river systems, except the Mobile, Pascagoula and Perdido river systems.

Habitat. Streams under rocks; secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Cambarus longirostris **Faxon 1885**

Distribution. North America: Tennessee River system in Georgia, Tennessee and North Carolina and introduced into South Carolina (Hobbs 1989); also known from Alabama. Alabama: Known from a total of 18 database records from the Tennessee River system in northern Alabama, and from the Coosa River system. There may be taxonomic issues with this taxon.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Cambarus ludovicianus **Faxon 1884; Painted Devil Crayfish**

Distribution. North America: Mississippi River system in Arkansas, Louisiana, Mississippi, and Tennessee, also known from eastern Texas (Hobbs 1989); in addition it has been reported from Alabama (Taylor et al. 1996) and Kentucky (Taylor and Schuster 2004). Alabama: Known from nine database records from the Tombigbee, Alabama and Mobile river systems in Greene, Montgomery, Pickens and Washington counties.

Habitat. Secondary and primary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Cambarus manningi* Hobbs 1981**

Distribution. North America: Endemic to the Coosa River system in Alabama, Georgia and Tennessee. Alabama: Known from 11 database records from the Coosa River system.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

***Cambarus miltus* Fitzpatrick 1978; Rusty Grave Digger**

Distribution. North America: Alabama and Florida (Taylor et al. 1996). Alabama: Known only from six database records from near the type locality in Baldwin County. Alabama Heritage Program has two records from Covington County. It is unknown who identified these specimens. They also indicate records from Corn Branch and Negro Creek in Baldwin County from work done by Fitzpatrick (1991). Fitzpatrick considered these possible records, since no form I males were collected to certify identification.

Habitat. Primary burrower.

Conservation Status. AFS Threatened; Provisional AL Priority 2.

***Cambarus obstipus* Hall 1959**

Distribution. North America: Thought to have been endemic to the Black Warrior River system in Alabama (Hobbs 1989). Alabama: Black Warrior River system; in addition, database records exist for the Tombigbee, Alabama, and Cahaba river systems.

Habitat. Streams under rocks.

Conservation Status. AFS Special Concern; Provisional AL Priority 5.

***Cambarus scotti* Hobbs 1981**

Distribution. North America: Endemic to the upper Coosa River system in Alabama and the Chatooga River system in Georgia (Hobbs 1989). Alabama: Known only from nine database records all from the upper Coosa River system (Chattooga River).

Habitat. Streams under rocks.

Conservation Status. AFS Threatened; Provisional AL Priority 4.

***Cambarus striatus* Hay 1902; Ambiguous Crayfish**

Distribution. North America: Florida, Georgia, South Carolina westward to Mississippi and north to Kentucky (Hobbs 1989). Alabama: Known from the Tennessee, Mobile, Tombigbee, Black Warrior, Cahaba, Coosa, Tallapoosa, Escambia, and Chattahootchee river systems.

Habitat. Streams under rocks; also can be primary or secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Cambarus tenebrosus* Hay 1902; Cavespring Crayfish**

Distribution. North America: From Illinois south to Alabama (Hobbs 1989). Alabama: Known only from the Tennessee River system.

Habitat. Cool water springs and streams under rocks; often found in caves.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Cambarus unestami* Hobbs and Hall 1969**

Distribution. North America: Tennessee River system in Georgia and Alabama; also known from the Little River system of the upper Coosa River in Georgia (Hobbs 1989). Alabama: Known only from two database records from the Tennessee River system in Jackson County, Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Cambarus veitchorum* Cooper and Cooper 1997a; White Spring Cave Crayfish**

Distribution. North America: Only known from Alabama. Alabama: Endemic to White Spring Cave, Tennessee River system, Limestone County, Alabama (Cooper and Cooper 1997a).

Habitat. Subterranean streams.

Provisional Conservation Status. AFS None; Provisional AL Priority 1.

***Cambarus* sp. A**

Distribution. North America: Jezerinac (1993) indicated that this undescribed species ranged from southern Michigan, western Ohio, Indiana, most of Illinois, western Kentucky west to eastern Missouri and south to the Gulf of Mexico in Mississippi, Alabama and far western Florida. Alabama: It is unclear what the exact distribution of this species is in Alabama.

Habitat. Secondary and primary burrower.

Conservatin Status. AFS None; Provisional AL Priority 3.

***Fallicambarus burrisi* Fitzpatrick 1987**

Distribution. North America: Chickasawhay and Escatawpa river systems in Alabama and Mississippi. Alabama: Known only from two database records from the Escatawpa River system in southwestern Alabama.

Habitat. Primary burrower in *Sarracenia* bogs.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Fallicambarus byersi* (Hobbs 1941); Lavender Burrowing Crayfish**

Distribution. North America: Okaloosa County, Florida, west to Bay St. Louis, Hancock County Mississippi. Alabama: Known from 17 database records from the Tombigbee, Alabama, Pascagoula, and Escatawpa river systems.

Habitat. Primary Burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Fallicambarus danielae* Hobbs 1975**

Distribution. North America: Known only southern Mississippi and southwestern Alabama. Alabama: Known from only four database records from the Mobile and Pascagoula river systems.

Habitat. Primary burrower.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Fallicambarus fodiens* (Cottle 1863); Digger Crayfish**

Distribution. North America: Southern Ontario, Michigan, Ohio, Indiana, and Illinois south to Arkansas, Mississippi, and Alabama (Hobbs 1989). Alabama: Known from 17 database records from the Tennessee, Tombigbee and Alabama river systems.

Habitat. Primary and secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Fallicambarus oryktes* (Penn and Marlow 1959)**

Distribution. North America: Southern Louisiana to southern Alabama (Hobbs 1989). Alabama: Known only from three database records from Baldwin and Mobile counties.

Habitat. Primary burrower

Conservation Status. AFS Special Concern; Provisional AL Priority 3.

***Faxonella clypeata* (Hay 1899); Ditch Fencing Crayfish**

Distribution. North America: Okalahoma and Texas east to Florida and north to South Carolina. Alabama: Known from 17 database records from the Mobile, Tombigbee, Alabama, Tallapoosa, Pascagoula, Escatawpa, Choctawhatchee, and Chattahootchee river systems (Hobbs 1989).

Habitat. Slow streams, marshes, swamps and ditches; tertiary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Hobbseus prominens* (Hobbs 1966a)**

Distribution. North America: Mobile River Basin in Alabama; northern Mississippi (Hobbs 1989). Alabama: Known from18 database records from the Tombigbee, Black Warrior, Alabama and Cahaba river systems.

Habitat. Secondary burrower in both lentic and lotic environments (Hobbs 1989).

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Orconectes alabamensis* (Faxon 1884)**

Distribution. North America: Tennessee River system in western Tennessee and northern Alabama. Alabama: Restricted to the Shoal Creek system in Lauderdale County, Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Special Concern; Provisional AL Priority 4.

***Orconectes australis australis* (Rhoades 1941b)**
Distribution. North America: Caves in southeastern Kentucky to western Tennessee and northern Alabama (Hobbs 1989). Alabama: Known only from caves in the Tennessee River system in Jackson and Madison counties (Hobbs 1989).

Habitat. Subterranean streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 2.

***Orconectes chickasawae* Cooper and Hobbs 1980**

Distribution. North America: Hobbs (1989) reported it only from the western tributaries of the Tombigbee River in Mississippi. Alabama: There is a single record of the species in the Illinois Natural History Survey database from the Tombigbee River system; another more questionable record from the University of Alabama database is from the Cahaba River system.

Habitat. Lentic and slow lotic environments (Hobbs 1989).

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Orconectes compressus* (Faxon 1884); Slender Crayfish**

Distribution. North America: Tennessee River system in Alabama, Mississippi and western Tennessee; Cumberland River system in Kentucky and Tennessee; Barren River system in Kentucky and Tennessee. Alabama: Known only from tributaries to the Tennessee River system in northern Alabama.

Habitat. Streams under rocks and gravel.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

***Orconectes cooperi* Cooper and Hobbs 1980**

Distribution. North America: Endemic to the Flint River system in northern Alabama and western Tennessee (Hobbs 1989). Alabama: Flint River system in Madison County, Alabama.

Habitat. Streams.

Conservation Status. AFS Endangered; Provisional AL Priority 4.

***Orconectes erichsonianus* (Faxon 1898)**

Distribution. North America: Tennessee, Elk and Coosa river systems in northern Alabama, northwestern Georgia, eastern Tennessee, and southwestern Virginia (Hobbs 1989). Alabama: Known from the Tennessee, Mobile, Black Warrior, Alabama, Cahaba, Coosa and Tallapoosa river systems.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Orconectes forceps* (Faxon 1 884)**

Distribution. North America: Tennessee River system from southwestern Virginia to Wayne County, Tennessee (Hobbs 1989), and northern Alabama. Alabama: Known from the tributaries of the Tennessee River; one questionable record from the University of Alabama database from the Mobile River system.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

Orconectes holti **Cooper and Hobbs 1980**

Distribution. North America: Alabama River system, Alabama. Alabama: Known only from tributaries of the Alabama River in Dallas, Lowndes, Montgomery, Perry, and Wilcox counties, Alabama (Hobbs 1989).

Habitat. Streams.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

Orconectes jonesi **Fitzpatrick 1992**

Distribution. North America: Sucarnoochee River system of Alabama and Mississippi. Alabama: Sucarnoochee River drainage in Sumter County.

Habitat. Streams.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

Orconectes lancifer **(Hagen 1870), Shrimp Crayfish**

Distribution. North America: Gulf coastal plain and Mississippi River embayment from eastern Texas to Mississippi north to Missouri, Kentucky and Illinois (Hobbs 1989); and Alabama. Alabama: Database records from the National Museum of Natural History from the Alabama River system.

Habitat. Slow streams and lotic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Orconectes mirus **(Ortmann 1931)**

Distribution. North America: Northern tributaries of the Tennessee River in western Tennessee and northern Alabama. Alabama: Tennessee River system in northern Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

Orconectes mississippiensis **(Faxon 1884)**

Distribution. North America: Tributaries of the Tombigbee River in Mississippi (Hobbs 1989), and Alabama. Alabama: Database records indicate it occurs in the Tombigbee and Black Warrior river systems, with one questionable Illinois Natural History Survey record from the Tennessee River system.

Habitat. Streams.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

Orconectes perfectus **Walls 1972**

Distribution. North America: Tombigbee and lower Alabama river systems in Alabama and Mississippi (Hobbs 1989). Alabama: Tombigbee, Black Warrior and Alabama river systems.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Orconectes placidus **(Hagen 1870); Bigclaw Crayfish**

Distribution. North America: Lower Ohio, Cumberland, Duck and Tennessee river systems in northern Alabama, Illinois, Kentucky and Tennessee. Alabama: Known only from the Tennessee River system in northern Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

Orconectes putnami **(Faxon 1884)**

Distribution. North America: Taylor (2000) defined the range as being disjunct with populations in the middle and upper Green River system and middle and upper Cumberland River system in Kentucky and Tennessee, in the western Highland Rim of the Tennessee River system of western Tennessee and northern Alabama. Alabama: Known only from the Tennessee River system in northern Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 4.

Orconectes sheltae **Cooper and Cooper 1997b**

Distribution. North America: Endemic to Shelta Cave, Alabama. Alabama: Known only from Shelta Cave, Madison County, Alabama.

Habitat. Subterranean streams.

Conservation Status. AFS None; Provisional AL Priority 2.

Orconectes spinosus **(Bundy 1877)**

Distribution. North America: Taylor (2000) defined the range as being restricted to the upper Coosa River system. His distribution map included localities in Georgia and Tennessee. Alabama: According to an Illinois Natural History Survey record it also is found in the upper Coosa River system in Alabama.

Habitat. Streams under rocks.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Orconectes validus **(Faxon 1914)**

Distribution. North America: Tennessee and Black Warrior systems in northern Alabama and western Tennessee (Hobbs 1989). Alabama: Known from the Tennessee, Tombigbee, Black Warrior and Alabama river systems.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Procambarus acutissimus **(Girard 1852)**

Distribution. North America: Chattahootchee River system in Georgia west to the Tombigbee River system in Mississippi (Hobbs 1989). Alabama: Known from all river systems in the state with the exception of the Mobile, Perdido, Choctawhatchee, and Chattahootchee river systems.

Habitat. Slow streams, pools and roadside ditches.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

Procambarus acutus acutus **(Girard 1852); White River Crawfish**

Distribution. North America: From Maine to the Florida panhandle west to Texas, and north to Minnesota (Hobbs 1989). Alabama: Known from all river systems in the state with the exception of the Cahaba, Tallapoosa, Perdido and Chattahootchee river systems.

Habitat. Slow streams and lentic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus bivittatus* Hobbs 1942; Ribbon Crayfish**

Distribution. North America: From the Escambia River system in Florida west to the Pearl River in Mississippi and Louisiana (Hobbs 1989). Alabama: Known from the Mobile, Tombigbee and Alabama river systems.

Habitat. Streams and sloughs.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus capillatus* Hobbs 1971**

Distribution. North America: Escambia River system in Alabama and Florida (Hobbs 1989). Alabama: Known only from the Escambia River system.

Habitat. Lentic environments; secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus clarkii* (Girard 1852); Red Swamp Crawfish**

Distribution. North America: Widespread from northern Mexico east to the panhandle of Florida, and north to Illinois and Ohio (Hobbs 1989). Alabama: Known from the Tennessee, Mobile, Black Warrior, Cahaba, Coosa, Tallapoosa, and Escambia river systems.

Habitat. Lentic and lotic environments; tertiary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus clemmeri* Hobbs 1975**

Distribution. North America: Pearl River system in southern Mississippi east to the Escatawpa River system in southern Alabama (Hobbs 1989). Alabama: Known from the Escatawpa River system (Pascagoula River); University of Alabama and Illinois Natural History Survey databases also include records from the Mobile and Escambia river systems.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus escambiensis* Hobbs 1942**

Distribution. North America: Perdido River system in Alabama (Hobbs 1989). Alabama: Restricted to the Perdido River system, Escambia County, Alabama.

Habitat. Temporarily flooded woodlands and floodplains; secondary burrower.

Conservation Status. AFS Endangered; Provisional AL Priority 3.

***Procambarus evermanni* (Faxon 1890)**

Distribution. North America: Escambia River system in Alabama and Yellow River system in Florida west to the Pearl River system in Mississippi. Alabama: Known from Escambia County; additional database records include the Mobile and Alabama river systems.

Habitat. Slow streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus hagenianus hagenianus* (Faxon 1884); Southeastern Prairie Crayfish**

Distribution. North America: According to Fitzpatrick (1978b) this subspecies is in the Tombigbee river system in Lowndes, Noxubee and Oktibbeha counties in Mississippi, and Marengo, Pickens and Sumter counties in Alabama. Alabama: Known only from the Tombigbee River system in Marengo, Pickens and Sumter counties.

Habitat. Primary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus hayi* (Faxon 1884)**

Distribution. North America: Tombigbee River system in Alabama, Tallahatchie River system in Mississippi, and the Hatchie River system in Tennessee (Hobbs 1989). Alabama: Known only from the Tombigbee River system.

Habitat. Slow streams and lentic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus hubbelli* (Hobbs 1938)**

Distribution. North America: Choctawhatchee and Yellow River systems in Alabama and Florida (Hobbs 1989). Alabama: Known only from the Yellow River system.

Habitat. Lentic environments; secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus hybus* Hobbs and Walton 1957**

Distribution. North America: Lower Alabama and Tombigbee river systems in Alabama and Mississippi, and the Yalabusha River system in Mississippi (Hobbs 1989). Alabama: Known from the Tombigbee, Black Warrior and Alabama river systems.

Habitat. Lentic environments; secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus lagniappe* Black 1968; Lagniappe Crayfish**

Distribution. North America: Tombigbee River system in Mississippi (Hobbs 1989), and in Alabama. Alabama: Known only from Sucarnoochee River system of the Tombigbee River, Sumter County, Alabama (Hartfield 1992).

Habitat. Streams.

Conservation Status. AFS Threatened; Provisional AL Priority 3.

***Procambarus lecontei* (Hagen 1870); Mobile Crayfish**

Distribution. North America: Pascagoula and Mobile river systems in Alabama and Mississippi (Hobbs 1989). Alabama: Known from the Mobile, lower Tombigbee and Pascagoula river systems.

Habitat. Streams.

Conservation Status. AFS Special Concern; Provisional AL Priority 4.

***Procambarus lewisi* Hobbs and Walton 1959**

Distribution. North America: Known from Barbour, Bulloch, Lowndes, Macon, Montgomery, and Russell counties Alabama (Hobbs 1989). Alabama: Collections are known from the Alabama and Choctawhatchee river systems.

Habitat. Slow streams and ditches.

Conservation Status. AFS Special Concern; Provisional AL Priority 3.

***Procambarus lophotus* Hobbs and Walton 1960**

Distribution. North America: Alabama River system in Alabama and Georgia, and the Tennessee River system in Georgia and Tennessee (Hobbs 1989). Alabama: Records are known from the Tennessee, Tombigbee, Black Warrior, Alabama, Coosa, Tallapoosa, Escambia and Choctawhatchee river systems.

Habitat. Lentic and lotic environments; tertiary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus marthae* Hobbs 1975**

Distribution. North America: Known from the Alabama River system in Alabama (Hobbs 1989). Alabama: Records are known from the Black Warrior, Cahaba and Alabama river sytems.

Habitat. Lentic and slow moving lotic environments.

Conservation Status. AFS Special Concern; Provisional AL Priority 3.

Procambarus okaloosae **Hobbs 1942**

Distribution. North America: Perdido, Escambia and Yellow river systems in Alabama and Florida. Alabama: Known from the Escambia and Yellow river systems.

Habitat. Lentic and lotic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Procambarus paeninsulanus **(Faxon 1914)**

Distribution. North America: Southern Georgia, Florida (Hobbs 1989), and southeastern Alabama. Alabama: Known from the Chattahootchee River system.

Habitat. Lentic and lotic environment, and rarely in caves; tertiary burrower (Hobbs 1989).

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Procambarus pecki **Hobbs 1967; Phantom Cave Crayfish**

Distribution. North America: Tennessee River system in northern Alabama. Alabama: Known from caves in Colbert, Lauderdale and Morgan counties.

Habitat. Subterranean streams.

Conservation Status. AFS Endangered; Provisional AL Priority 2.

Procambarus shermani **Hobbs 1942**

Distribution. North America: Escambia River system in Florida west to the Pearl River system in Mississippi (Hobbs 1989). Alabama: Known from the Mobile, Tombigbee, Alabama and Pascagoula river systems.

Habitat. Streams and sloughs; secondary burrower.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

Procambarus spiculifer **(LeConte 1856)**

Distribution. North America: Georgia south to Florida, and west to the Mobile and Alabama Rive systems in Alabama (Hobbs 1989). Alabama: Known from every river system in Alabama, with the exception of the Tennessee and Escatawpa river systems.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus suttkusi* Hobbs 1953**

Distribution. North America: Choctawhatchee River system in Alabama and Florida (Hobbs 1989), and Chattahootchee River system in Alabama. Alabama: Known from the Choctawhatchee and Chattahootchee river systems.

Habitat. Streams.

Conservation Status. AFS Special Concern; Provisional AL Priority 3.

***Procambarus verrucosus* Hobbs 1952**

Distribution. North America: Southeastern Alabama between the Alabama and Chattahootchee river systems (Hobbs 1989). Alabama: Known from the Alabama, Tallapoosa, Escambia and Chattahootchee river systems.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus versutus* (Hagen 1870)**

Distribution. North America: Mobile River system east to the Chattahootchee River system in Alabama, Florida and Georgia (Hobbs 1989). Alabama: Known from every river system in Alabama, with the exception of the Tennessee River system.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 5.

***Procambarus viaeviridis* (Faxon 1914)**

Distribution. North America: Southern Illinois south to Arkansas and Louisiana, and east to Alabama (Hobbs 1989). Alabama: Reported only from the Tennessee River system in northern Alabama.

Habitat. Slow streams and lentic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus vioscai paynei* Fitzpatrick 1990**

Distribution. North America: East of the Mississippi River from the Wolfe River in Tennessee to the Tombigbee River system in Alabama, south and west to the Pascagoula, Bogue Chitto and Homochitto river systems in Mississippi (Fitzpatrick 1990). Alabama: Reported from the Tombigbee and Black Warrior river systems.

Habitat. Streams.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

***Procambarus zonangulus* Hobbs and Hobbs 1990**

Distribution. North America: The exact range of this species is not clearly understood. Hobbs and Hobbs (1990) in their description of this species reported it only from southeastern Texas. Taylor et al. (1996) reported it from Alabama, Louisiana, Mississippi and Texas. Alabama: It is unclear what the exact distribution of this species is in Alabama.

Habitat. Slow streams and lentic environments.

Conservation Status. AFS Currently Stable; Provisional AL Priority 3.

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Tables

Table 1. Crayfish species and subspecies with descriptions based on Alabama specimens and their corresponding reference.

Species	Reference
Cambarellus diminutus	Hobbs 1954
C. lesliei	Fitzpatrick and Laning 1942
Cambarus acanthura	Hobbs 1981
C. cracens	Bouchard and Hobbs 1976
C. girardianus	Faxon 1884
C. jonesi	Hobbs and Barr 1960
C. miltus	Fitzpatrick 1978
C. obstipus	Hall 1959
C. scotti	Hobbs 1981
C. veitchorum	Cooper and Cooper 1997a
Hobbseus prominens	Hobbs 1966
Orconectes alabamensis	Faxon 1884
O. australis australis	Rhoades 1941
O. compressus	Faxon 1884
O. cooperi	Cooper and Hobbs 1980
O. forceps	Faxon 1884
O. holti	Cooper and Hobbs 1980
O. jonesi	Fitzpatrick 1992
O. perfectus	Walls 1972
O. sheltae	Cooper and Cooper 1997b
O. validus	Faxon 1914
Procambarus capillatus	Hobbs 1971
P. evermanni	Faxon 1890
P. hybus	Hobbs and Walton 1959
P. lecontei	Hagen 1870
P. lewisi	Hobbs and Walton 1959
P. lophotus	Hobbs and Walton 1960
P. marthae	Hobbs 1975
P. pecki	Hobbs 1967
P. suttkusi	Hobbs 1953
P. verrucosus	Hobbs 1952
P. versutus	Hagen 1870
P. vioscai paynei	Fitzpatrick 1990

Table 2. Preliminary checklist of the crayfishes (Cambaridae) of Alabama

Subfamily **Cambarellinae** Laguarda 1961
- Genus ***Cambarellus*** Ortmann 1905
  - Subgenus ***Dirigicambarus*** Fitzpatrick 1983
    - *Cambarellus* (*D.*) *shufeldtii* (Faxon 1884)
  - Subgenus ***Pandicambarus*** Fitzpatrick 1983
    - *Cambarellus* (*P.*) *diminutus* Hobbs 1945
    - *Cambarellus* (*P.*) *lesliei* Fitzpatrick and Laning 1976

Subfamily **Cambarinae** Hobbs 1942
- Genus ***Cambarus*** Erichson 1846
  - Subgenus ***Aviticambarus*** Hobbs 1969
    - *Cambarus* (*A.*) *hamulatus* (Cope 1881)
    - *Cambarus* (*A.*) *jonesi* Hobbs and Barr 1960
    - *Cambarus* (*A.*) *veitchorum* Cooper and Cooper 1997
  - Subgenus ***Cambarus*** Erichson 1846
    - *Cambarus* (*C.*) *bartonii cavatus* Hay 1902
    - *Cambarus* (*C.*) *howardi* Hobbs and Hall 1969
  - Subgenus ***Depressicambarus*** Hobbs 1969
    - *Cambarus* (*D.*) *englishi* Hobbs and Hall 1972
    - *Cambarus* (*D.*) *graysoni* Faxon 1914
    - *Cambarus* (*D.*) *halli* Hobbs 1968
    - *Cambarus* (*D.*) *latimanus* LeConte 1856
    - *Cambarus* (*D.*) *obstipus* Hall 1959
    - *Cambarus* (*D.*) *striatus* Hay 1902
  - Subgenus ***Erebicambarus*** Hobbs 1969
    - *Cambarus* (*E.*) *tenebrosus* Hay 1902
  - Subgenus ***Exilicambarus*** Bouchard and Hobbs 1976
    - *Cambarus* (*E.*) *cracens* Bouchard and Hobbs 1976
  - Subgenus ***Hiaticambarus*** Hobbs 1969
    - *Cambarus* (*H.*) *girardianus* Faxon 1884
    - *Cambarus* (*H.*) *longirostris* Faxon 1885
    - *Cambarus* (*H.*) *manningi* Hobbs 1981
  - Subgenus ***Jugicambarus*** Hobbs 1969
    - *Cambarus* (*J.*) *distans* Rhoades 1944
    - *Cambarus* (*J.*) *unestami* Hobbs and Hall 1969
  - Subgenus ***Lacunicambarus*** Hobbs 1969
    - *Cambarus* (*L.*) *diogenes* Girard 1852
    - *Cambarus* (*L.*) *ludovicianus* Faxon 1884
    - *Cambarus* (*L.*) *miltus* Fitzpatrick 1978
  - Subgenus ***Puncticambarus*** Hobbs 1969
    - *Cambarus* (*P.*) *coosae* Hobbs 1981
    - *Cambarus* (*P.*) *scotti* Hobbs 1981
  - Subgenus ***Tubericambarus*** Jezerinac 1993

Cambarus (*T.*) *acanthura* Hobbs 1981
Cambarus (*T.*) sp. A
Genus ***Fallicambarus*** Hobbs 1969
Subgenus ***Creaserinus*** Hobbs 1973
Fallicambarus (*C.*) *burrisi* Fitzpatrick 1987
Fallicambarus (*C.*) *byersi* (Hobbs 1941)
Fallicambarus (*C.*) *danielae* Hobbs 1975
Fallicambarus (*C.*) *fodiens* (Cottle 1863)
Fallicambarus (*C.*) *oryktes* (Penn and Marlow 1959)
Genus ***Faxonella*** **Creaser 1933**
Faxonella clypeata (Hay 1899)
Genus ***Hobbseus*** **Fitzpatrick and Payne 1968**
Hobbseus prominens (Hobbs 1966)
Genus ***Orconectes*** Cope 1872
Subgenus ***Crockerinus*** Fitzpatrick 1987
Orconectes (*C.*) *erichsonianus* (Faxon 1898)
Subgenus ***Gremicambarus*** Fitzpatrick 1987
Orconectes (*G.*) *compressus* (Faxon 1884)
Subgenus ***Hespericambarus*** Fitzpatrick 1987
Orconectes (*H.*) *perfectus* Walls 1972
Subgenus ***Orconectes*** Cope 1872
Orconectes (*O.*) *australis australis* (Rhoades 1941)
Orconectes (*O.*) *sheltae* Cooper and Cooper 1997
Subgenus ***Procericambarus*** Fitzpatrick 1987
Orconectes (*P.*) *forceps* (Faxon 1884)
Orconectes (*P.*) *mirus* (Ortmann 1931)
Orconectes (*P.*) *placidus* (Hagen 1870)
Orconectes (*P.*) *putnami* (Faxon 1884)
Orconectes (*P.*) *spinosus* (Bundy 1877)
Subgenus ***Tragulicambarus*** Fitzpatrick 1987
Orconectes (*T.*) *lancifer* (Hagen 1870)
Subgenus ***Trisellescens*** Bouchard and Bouchard 1995
Orconectes (*T.*) *alabamensis* (Faxon 1884)
Orconectes (*T.*) *chickasawae* Cooper and Hobbs 1980
Orconectes (*T.*) *cooperi* Cooper and Hobbs 1980
Orconectes (*T.*) *holti* Cooper and Hobbs 1980
Orconectes (*T.*) *jonesi* Fitzpatrick 1992
Orconectes (*T.*) *mississippiensis* (Faxon 1884)
Orconectes (*T.*) *validus* (Faxon 1914)
Genus ***Procambarus*** Ortmann 1905
Subgenus ***Girardiella*** Lyle 1938
Procambarus (*G.*) *hagenianus hagenianus* (Faxon 1884)
Subgenus ***Leconticambarus*** **Hobbs 1972**
Procambarus (*L.*) *capillatus* Hobbs 1971
Procambarus (*L.*) *escambiensis* Hobbs 1942
Procambarus (*L.*) *hubbelli* (Hobbs 1939)

Procambarus (*L.*) *shermani* Hobbs 1942

Subgenus ***Ortmannicus*** Fowler 1912

Procambarus (*O.*) *acutissimus* (Girard 1852)
Procambarus (*O.*) *acutus acutus* (Girard 1852)
Procambarus (*O.*) *bivittatus* Hobbs 1942
Procambarus (*O.*) *evermanni* (Faxon 1890)
Procambarus (*O.*) *hayi* (Faxon 1884)
Procambarus (*O.*) *hybus* Hobbs and Walton 1957
Procambarus (*O.*) *lecontei* (Hagen 1870)
Procambarus (*O.*) *lewisi* Hobbs and Walton 1959
Procambarus (*O.*) *lophotus* Hobbs and Walton 1960
Procambarus (*O.*) *marthae* Hobbs 1975
Procambarus (*O.*) *verrucosus* Hobbs 1952
Procambarus (*O.*) *viaeviridis* (Faxon 1914)
Procambarus (*O.*) *zonangulus* Hobbs and Hobbs 1990

Subgenus ***Pennides*** Hobbs 1972

Procambarus (*P.*) *clemmeri* Hobbs 1975
Procambarus (*P.*) *lagniappe* Black 1968
Procambarus (*P.*) *spiculifer* (LeConte 1856)
Procambarus (*P.*) *suttkusi* Hobbs 1953
Procambarus (*P.*) *versutus* (Hagen 1870)
Procambarus (*P.*) *vioscai paynei* Fitzpatrick 1990

Subgenus ***Remoticambarus*** Hobbs 1972

Procambarus (*R.*) *pecki* Hobbs 1967

Subgenus ***Scapulicambarus*** Hobbs 1972

Procambarus (*S.*) *clarkii* (Girard 1852)
Procambarus (*S.*) *okaloosae* Hobbs 1942
Procambarus (*S.*) *paeninsulanus* (Faxon 1914)

Table 3. Crayfish taxa that have questionable occurrence in the state of Alabama.

***Cambarellus* (*P.*) *schmitti* Hobbs 1942** – A single USNM database record from Marengo County. Identified by Hobbs. Probably a misidentification of *Cambarellus lesliei*. Not reported from Alabama by Taylor et al. 1996.

***Cambarus* (*D.*) *sphenoides* Hobbs 1968** – A single USNM database record from the Tennessee River system, Madison County. One INHS record from Coosa River system, Shelby County. Not reported from Alabama by Taylor et al. 1996.

***Cambarus* (*E.*) *rusticiformis* Rhoades 1944** – A single tentative USNM record from the Paint Rock river system in northern Alabama. Not reported from Alabama by Taylor et al. 1996.

***Cambarus* (H.) *speciosus* Hobbs 1981** – A single record from the University of Alabama database from the upper Coosa River system in Alabama, identified by J. Fitzpatrick. Not reported from Alabama by Taylor et al. 1996.

***Cambarus* (*J.*) *parvoculus* Hobbs and Shoup 1947** – A single USNM record from Dade County. Not reported from Alabama by Taylor et al. 1996.

***Orconectes* (*G.*) *virilis* Hagen 1870** – Reported by Taylor et al. 1996 as a suspected introduction. However, reports of this species in Alabama are probably due to misidentification of *O. Trisellescens* species.

***Orconectes* (*T.*) *immunis* (Hagen 1979)** – Reported by Taylor et al. 1996 from Alabama. However, reports of this species in Alabama are probably due to misidentification of other *O. Trisellescens* species.

***Orconectes* (*T.*) *rhoadesi* Hobbs 1949** – Several USNM database records from Alabama; probably misidentification of other species of *O. Trisellescens*. Not reported from Alabama by Taylor et al. 1996.

***Procambarus* (*G.*) *hagenianus vesticeps* Fitzpatrick 1977** - Fitzpatrick (1978b) lists the range of this subspecies as being north of Tibbie Creek in the Tombigbee River system in Chickasaw, Clay, Monroe, and Pontotoc counties, Mississippi. The National Museum of Natural History indicates 14 paratypes of this subspecies from Carrolton, Pickens County, Alabama. This apparently is in error, but needs to be verified. Not reported from Alabama by Taylor et al. 1996.

Table 4. Distribution of crayfishes in Alabama river systems. (X=occurrence in any database)

Genus	Subgenus	Species	Subspecies	TN	Mobile Basin							Coastal River Systems				CH	Totals
					MO	TO	BW	AL	CA	CO	TA	PA	PE	ES	CT		
Cambarellus	*Dirigicambarus*	*shufeldtii*			X												1
Cambarellus	*Pandicambarus*	*diminutus*			X							X					2
Cambarellus	*Pandicambarus*	*lesliei*			X	X		X									3
Cambarus	*Aviticambarus*	*hamulatus*		X			X										2
Cambarus	*Aviticambarus*	*jonesi*		X													1
Cambarus	*Aviticambarus*	*veitchorum*		X													1
Cambarus	*Cambarus*	*bartonii*	*cavatus*													X	1
Cambarus	*Cambarus*	*howardi*														X	1
Cambarus	*Depressicambarus*	*englishi*									X						1
Cambarus	*Depressicambarus*	*graysoni*		X													1
Cambarus	*Depressicambarus*	*halli*		X				X	X	X	X						5
Cambarus	*Depressicambarus*	*latimanus*		X		X	X	X	X	X	X			X	X	X	10
Cambarus	*Depressicambarus*	*obstipus*				X	X	X	X								4
Cambarus	*Depressicambarus*	*striatus*		X	X	X	X		X	X	X			X		X	9
Cambarus	*Erebicambarus*	*tenebrosus*		X													1
Cambarus	*Exilicambarus*	*cracens*		X			X			X	X						4
Cambarus	*Hiaticambarus*	*girardianus*		X	X				X	X							4
Cambarus	*Hiaticambarus*	*longirostris*		X						X							2
Cambarus	*Hiaticambarus*	*manningi*								X							1
Cambarus	*Jugicambarus*	*distans*		X													1
Cambarus	*Jugicambarus*	*unestami*		X													1
Cambarus	*Lacunicambarus*	*diogenes*		X	X	X	X	X		X	X			X	X	X	10
Cambarus	*Lacunicambarus*	*ludovicianus*				X		X									2
Cambarus	*Lacunicambarus*	*miltus*			X												1
Cambarus	*Puncticambarus*	*coosae*			X			X	X	X							4
Cambarus	*Puncticambarus*	*scotti*								X							1
Cambarus	*Tubericambarus*	*acanthura*		X		X	X	X	X	X		X	X	X		X	10
Cambarus	*Tubericambarus*	sp. A															?
Fallicambarus	*Creaserinus*	*burrisi*										X					1
Fallicambarus	*Creaserinus*	*byersi*				X		X				X		X			4
Fallicambarus	*Creaserinus*	*danielae*			X							X					2
Fallicambarus	*Creaserinus*	*fodiens*		X		X		X									3
Fallicambarus	*Creaserinus*	*oryktes*			X							X					2

Table 4. Continued.

Genus	Subgenus	Species	Subspecies	TN	Mobile Basin							Coastal River Systems				CH	Totals
					MO	TO	BW	AL	CA	CO	TA	PA	PE	ES	CT		
Faxonella		*clypeata*			X	X		X			X	X		X	X	X	8
Hobbseus		*prominens*				X	X	X	X								4
Orconectes	*Crockerinus*	*erichsonianus*		X	X		X	X	X	X	X						7
Orconectes	*Gremicambarus*	*compressus*		X													1
Orconectes	*Hespericambarus*	*perfectus*				X	X	X			X						4
Orconectes	*Orconectes*	*australis*	*australis*	X													1
Orconectes	*Orconectes*	*sheltae*		X													1
Orconectes	*Procericambarus*	*forceps*		X	X												2
Orconectes	*Procericambarus*	*mirus*		X													1
Orconectes	*Procericambarus*	*placidus*		X													1
Orconectes	*Procericambarus*	*putnami*		X													1
Orconectes	*Procericambarus*	*spinosus*		X			X	X		X							4
Orconectes	*Tragulicambarus*	*lancifer*						X									1
Orconectes	*Triscellescens*	*alabamensis*		X													1
Orconectes	*Triscellescens*	*chickasawae*				X			X								2
Orconectes	*Triscellescens*	*cooperi*		X													1
Orconectes	*Triscellescens*	*holti*						X									1
Orconectes	*Triscellescens*	*jonesi*				X	X										2
Orconectes	*Triscellescens*	*mississippiensis*		X		X	X										3
Orconectes	*Triscellescens*	*validus*		X		X	X	X									4
Procambarus	*Girardiella*	*hagenianus*	*hagenianus*			X											1
Procambarus	*Leconticambarus*	*capillatus*												X			1
Procambarus	*Leconticambarus*	*escambiensis*												X			1
Procambarus	*Leconticambarus*	*hubbelli*												X			1
Procambarus	*Leconticambarus*	*shermani*			X	X		X				X					4
Procambarus	*Ortmannicus*	*acutissimus*		X		X	X	X	X	X	X			X	X		9
Procambarus	*Ortmannicus*	*acutus*	*acutus*	X	X	X	X	X		X		X		X	X		9
Procambarus	*Ortmannicus*	*bivittatus*			X	X		X									3
Procambarus	*Ortmannicus*	*evermanni*			X			X									2
Procambarus	*Ortmannicus*	*hayi*				X											1
Procambarus	*Ortmannicus*	*hybus*				X	X	X									3

Table 4. Continued.

Genus	Subgenus	Species	Subspecies	TN	Mobile Basin							Coastal River Systems				CH	Totals
					MO	TO	BW	AL	CA	CO	TA	PA	PE	ES	CT		
Procambarus	*Ortmannicus*	*lecontei*			X	X						X					3
Procambarus	*Ortmannicus*	*lewisi*						X								X	2
Procambarus	*Ortmannicus*	*lophotus*		X		X	X	X		X	X			X	X		8
Procambarus	*Ortmannicus*	*marthae*					X	X	X								3
Procambarus	*Ortmannicus*	*verrucosus*						X			X			X		X	4
Procambarus	*Ortmannicus*	*viaeviridis*		X													1
Procambarus	*Ortmannicus*	*zonangulus*															?
Procambarus	*Pennides*	*clemmeri*			X							X		X			3
Procambarus	*Pennides*	*lagniappe*				X											1
Procambarus	*Pennides*	*spiculifer*			X	X	X	X	X	X	X		X	X	X	X	11
Procambarus	*Pennides*	*suttkusi*													X	X	2
Procambarus	*Pennides*	*versutus*			X	X	X	X	X	X	X	X	X	X	X	X	12
Procambarus	*Pennides*	*vioscai*	*paynei*			X	X										2
Procambarus	*Remoticambarus*	*pecki*		X													1
Procambarus	*Scapulicambarus*	*clarkii*		X	X		X		X	X	X			X			7
Procambarus	*Scapulicambarus*	*okaloosae*												X			1
Procambarus	*Scapulicambarus*	*paeninsulanus*														X	1
Total Number of Species:		81		35	22	29	23	30	15	19	15	12	3	18	9	13	

Abbreviations:

TN- Tennessee River Drainage
MO- Mobile River Drainage
TO- Tombigbee River Drainage
BW- Black Warrior River Drainage
AL- Alabama River Drainage
CA- Cahaba River Drainage
CO- Coosa River Drainage
TA- Tallapoosa River Drainage
PA- Escatawpa River System of Pascagoula River Drainage
PE- Perdido River Drainage
ES- Escambia (Conecuh), Blackwater and Yellow river systems of Pensacola Bay
CT- Choctawhatchee River Drainage
CH- Chattahootchee and Chopola river systems of the Apalachicola River Basin